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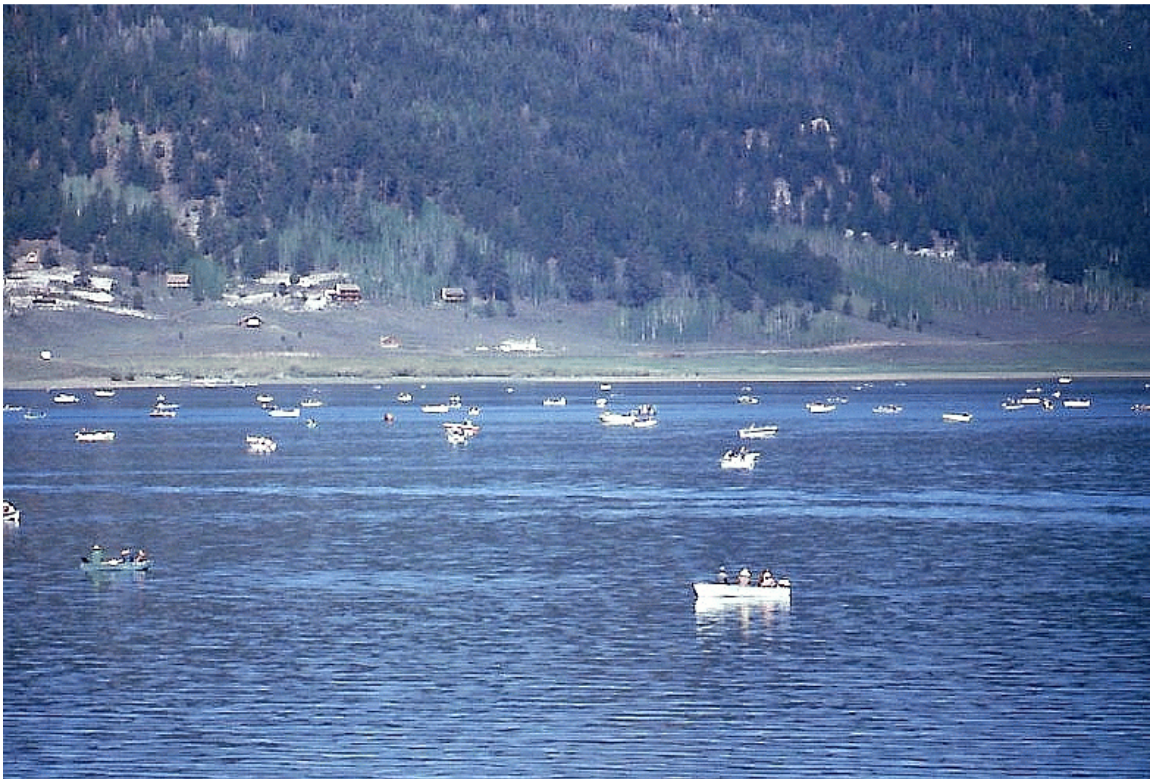

Panguitch Lake Fisheries Enhancement

January 2006

Prepared by

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and

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SECTION 4.0 ENVIRONMENTAL CONSEQUENCES

Abstract

Panguitch Lake is located approximately 18 miles southwest of the town of Panguitch in Garfield County, Utah. The lake was naturally impounded, but due to increased needs for irrigation downstream, the impoundment was raised by the Panguitch Irrigation Company (owner of all the storage water rights). The lake is situated at an elevation of 8,212 feet and covers 1,234 surface acres with a capacity of 40,100 acre-feet of water (22,000 acre-feet of storage water right and 13,800 acre-feet of dead storage water right). The maximum depth of the lake is 66 feet. The lake is the source of Panguitch Creek, and is fed by three small inlet stream; Blue Springs Creek, Clear Creek, and Ipson Creek. Property ownership of the lake is a quarter private and three quarters under management by the U.S. Forest Service (USFS), Dixie National Forest. The lake is managed cooperatively by the USFS and the Panguitch Irrigation Company, with the Utah Division of Wildlife Resources (UDWR) providing fishery resource management.

Panguitch Lake is one of Southern Utah's most popular and productive fisheries. However, from 1993 until 2004 Utah chub (*Gila atraria*) populations on the lake expanded dramatically and by 2004 these fish made up 94% of all fish captured during spring trend-netting surveys. Consequently, competition with other species has resulted in the decline of angling success and recreation. To address this problem the Panguitch Lake Advisory Committee was formed. The committee is comprised of individuals from various groups or agencies that have an interest in Panguitch Lake and its future. To enhance this fishery the Panguitch Lake Advisory Committee, the Division and the U.S. Fish and Wildlife Service (Service) propose to treat Panguitch Lake, the lower portions of its three inlet streams, the upper reaches of Panguitch Creek, and several small ponds within the drainage with the fish toxicant rotenone. The treatment would be conducted with the express purpose of removing Utah chub from the drainage. The UDWR proposes to conduct this treatment in the spring of the year, shortly after ice-out, to avoid thick weed beds that develop during the summer in the shallow portions of Panguitch Lake (or at any other time of the year that weeds are not a problem). These weeds significantly reduce the effectiveness of a chemical treatment. Because of the uncertainty of weather a treatment could require 2-3 weeks to complete. However, a treatment this size should take only 2-4 days. Once treated, Panguitch Lake could remain toxic to fish for 4 weeks or more. The project will be implemented in 2006 and will be funded in-part with a federal grant under the Dingell-Johnson Sport Fish Restoration Act and with matching State license fee funds. The Service administers the D-J Sport Fish Restoration program and must determine the proposed project's eligibility for federal funding, assess its character and design, and ensure compliance with Federal rules and regulations before approving the grant. This Environmental Assessment documents the analysis of the "Proposed Action" as well as the "No Action" alternative and is necessary for compliance under the National Environmental Policy Act (NEPA) to determine whether there are significant adverse environmental impacts which would require preparation of an Environmental Impact Statement.

SECTION 1: PURPOSE AND NEED FOR ACTION

1.1 PURPOSE

The primary purpose of the proposed action is to enhance sport fish populations in Panguitch Lake by removing Utah chubs *(Gila atraria)* using a chemical fish toxicant (rotenone) in the spring of 2006 and to restore the fishery through stocking.

1.2 NEED FOR ACTION

A need was identified by local businesses, area anglers, and the UDWR to enhance sport fishing in Panguitch Lake. Specifically, from 1993 until 2004 Utah chub populations expanded dramatically in the lake. These expansions were accompanied by significant declines in gill-net catch rates of trout. By 2004 Utah chubs made up over 94% of all fish sampled in Panguitch Lake and angling success had declined significantly. Utah chubs are not native to Panguitch Lake and are believed to have been introduced by careless anglers. These fish are fertile spawners and are capable of dramatic expansions in their numbers. In addition, Utah chubs are effective competitors and have been successful in suppressing trout populations in this and other area waters. However, because of the poor quality of their flesh and their relatively small size, these fish provide little or no recreational angling activity. Past expansions of Utah chubs in other water bodies have necessitated chemical treatments to remove these fish, restore angling opportunities, and create healthy fish communities. These conditions again demonstrate a need to remove Utah chub from Panguitch Lake to enhance the quality of angling at this important fishery.

1.3 DECISIONS TO BE MADE

The decision to be made from this analysis is whether to enhance the sport fishery in Panguitch Lake by removing Utah chub using rotenone. The agencies and officers responsible for the decisions are listed below:

U. S. Fish and Wildlife Service	Utah Division of Wildlife Resources
Regional Director	Regional Supervisor

1.4 REQUIRED PERMITS

A Pesticide Use Proposal must be approved by the Forest Supervisor of the Dixie National Forest prior to implementing the project.

SECTION 2: PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION AND ALTERNATIVES

2.1.1 Proposed Action

The Service and the UDWR propose to treat Panguitch Lake, portions of three inlet streams, the upper reaches of Panguitch Creek, and two small ponds with the fish toxicant rotenone (Figure 2.1). The treatment would occur in spring 2006 or 2007 and, under the right conditions, would require approximately 2-4 days to complete. Spring treatment is preferred to avoid thick weed beds that form in Panguitch Lake during the summer and fall months. These weeds reduce the effective mixing of toxic waters in the lake. However, if spring runoff is too high treatment may be delayed for an unknown period of time. The treatment would be conducted with the express purpose of removing Utah chub from the drainage. All fish would be eliminated from target waters. Panguitch Lake, its inlet streams, and the upper reaches of Panguitch Creek would be restocked with rainbow trout, 4-5 weeks after treatment. Roughly 35,800 acre-feet of lake water will be treated. In addition, nearly 5 miles of inlet stream and approximately 6 miles of the outlet stream would also be treated.

Currently, the upper 6 miles of the outlet stream, down to Butler Creek, are de-watered during the winter of each year and restocked annually during summer months when irrigation flows occur. Consequently, the few fish removed from this section of stream would be replaced by normal annual stocking after detoxification. Detox stations utilizing potassium permanganate would be used to protect fish downstream from this section should lake releases remain toxic for over 6 miles. Toxicity would be assessed by placing sentinel fish in live cages near Butler Creek. In the event that fish were lost in this section of stream, they can easily be replaced by stocking. Currently, only brown trout (*Salmo trutta*) and speckled dace *(Rhinichthys osculus)* maintain wild populations in the lower sections of Panguitch Creek. Wild and domestic brown trout populations lost through natural events such as floods and fire are often re-established by stocking. Speckled dace removed by rotenone in other area streams during native trout restoration projects have been successfully re-established by transplanting wild fish from other area streams. It is unlikely that significant losses of either species will occur. Because Panguitch Creek is detached from the Sevier River by irrigation diversions near the town of Panguitch (17 miles downstream from Panguitch Lake), there is little chance that rotenone will travel outside the project area.

Rotenone was selected as the chemical to use because of its effectiveness in controlling fish populations and its lack of long term effects on the environment. Rotenone has been used successfully in similar projects and application techniques have been refined to minimize adverse side effects to the environment. Liquid emulsifiable and powder rotenone (Liquid Rotenone, 5% Active Ingredient, EPA Registration No. 432-172; Powder Rotenone, 7.4% Active Ingredient, EPA Registration No. 6458-6) would be used to treat

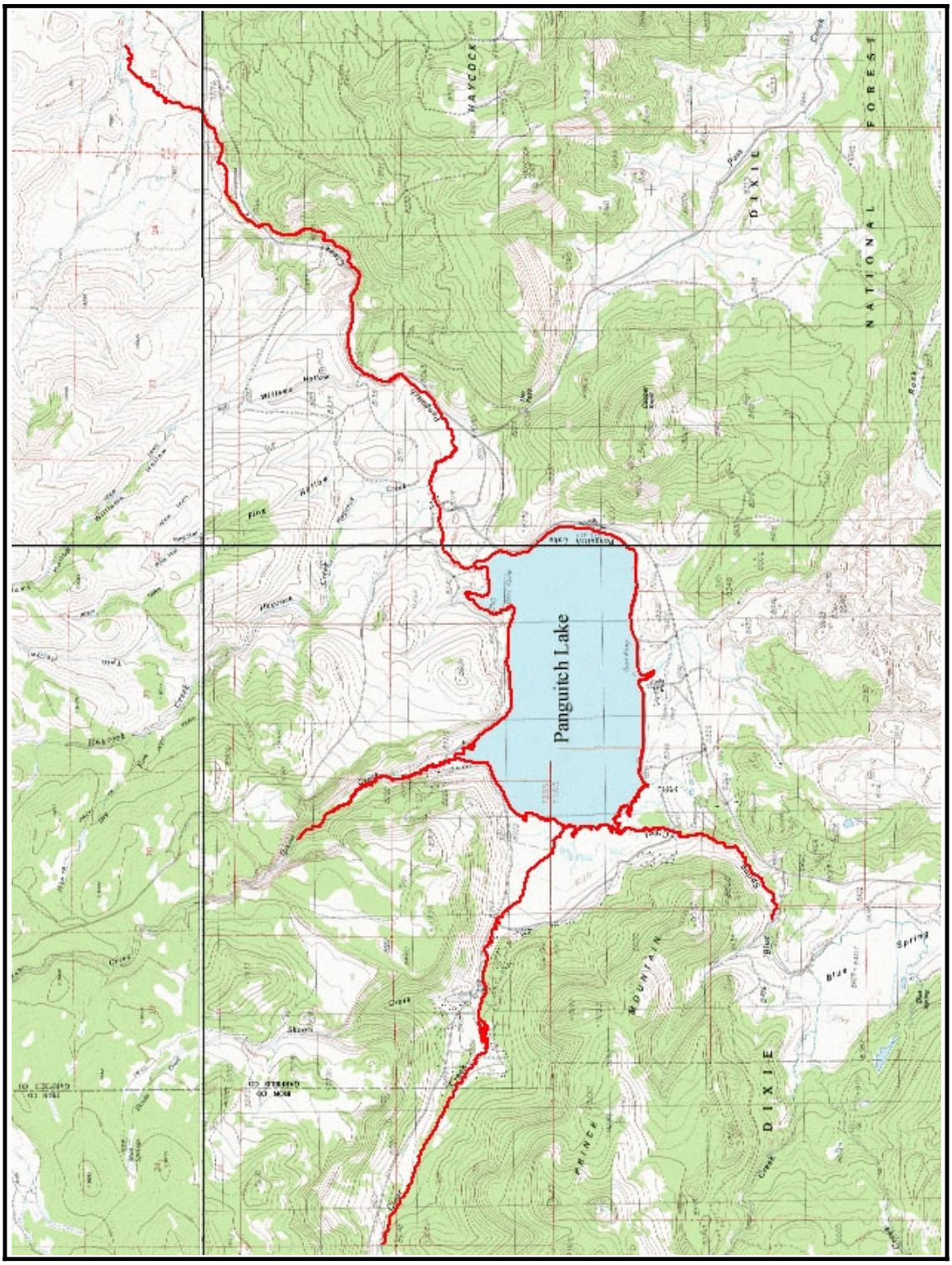

Figure 2.1. Map of Panguitch Lake and the surrounding area showing the proposed extent of the treatment (outlined in red).

target waters. Liquid Rotenone would be applied at a rate of approximately 1.0 ppm, but would not exceed 6.0 ppm. In Panguitch Lake liquid rotenone would be dispersed from small water-craft and from shore using pressurized backpack spray units. In streams, liquid rotenone would be applied using drip stations located at roughly 0.5 mile intervals. Pressurized backpack sprayers would be used to apply a diluted solution of the chemical to springs and backwater areas containing fish which were not effectively treated by boat or drip station. Powder Rotenone would be applied at approximately 1.0 ppm to Panguitch Lake using venturi units to mix powder into wet slurry and then pump it into the lake. Toxic water from Panguitch Lake would kill fish in Panguitch Creek, downstream from the lake, for up to 15 miles. Application of the chemical would be conducted by UDWR personnel certified as Non-commercial Pesticide Applicators by the Utah Department of Agriculture. Safety gear including rubber gloves, protective coveralls and respirators would be used where appropriate and information about the use and toxicity of rotenone can be found in Appendix C.

Prior to treatment, during winter and early spring, bag limits will be liberalized to allow anglers to harvest additional trout. Following treatment all fish will be left to decompose and return, in the form of nutrients, to the lake. These nutrients will stimulate the recovery of aquatic insects and zooplankton that will help re-establish the fishery.

Panguitch Lake would remain toxic from 3-4 weeks (depending on water temperatures) and then would be restocked with catchable rainbow trout *(Oncorhynchus mykiss)* to provide a summer fishery. In addition, fingerling rainbow trout would be restocked for the following season, while predatory Bear Lake Bonneville cutthroat trout *(Oncorhynchus clarkii utah)* and tiger trout *(Salmo trutta x Salvelinus namaycush)* would be stocked to ensure that Utah chubs, if they should return, would not expand to pre-treatment levels. Treated reaches of inlet streams would be restocked with native Bonneville cutthroat trout. The treatment would be preceded by news releases in various media outlets in Utah and surrounding states to notify the public of the treatment.

Education and outreach activities will focus on the preservation of the fishery and will include information regarding the consequences of live bait, illegal fish introductions, the need for predator protection and release, and the costs associated with failed compliance. In addition, the Panguitch Lake management plan (Appendix B), created by the Panguitch Lake Advisory Committee, will be presented to the Utah State Regional Advisory Council (RAC) and the Utah Wildlife Board for approval.

Because of the large cost of the project and the economic need to quickly re-establish a sport fishery, a second treatment is not feasible. Future management of Panguitch Lake will be designed to extend the life of the rotenone treatment indefinitely. Rainbow trout will continue to be stocked in large numbers to provide a family fishery. However, two salmonid predators will also be stocked to help control Utah chubs only if chubs return to the lake. These fish will be the Bear Lake Bonneville cutthroat trout and the tiger trout (additional predators may also be utilized). A four fish limit will be

recommended for rainbow trout along with a restricted harvest of only one cutthroat and/or tiger trout over 22 inches in length (Appendix B).

2.1.2 No Action

The "No Action" alternative would result in a continuation of current trends. Under this alternative, the quality of the fishery would likely continue to decline. Species composition of the Panguitch Lake fishery would remain predominantly Utah chubs and Panguitch Lake would provide relatively little fishing recreation. Under the No Action Alternative, no progress would be made toward meeting the primary objective of the project.

2.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER

2.2.1 Stocking Piscivorous Trout

At other waters predacious trout such as Bear Lake cutthroat trout, brown trout *(Salmo trutta)*, tiger trout (*Salmo trutta* x *Salvelinus fontinalis*), and splake *(Salvelinus namaycush x Salvelinus fontinalis)* have been stocked in large numbers and afforded special protection to grow large enough to prey on chubs. However, with the enormous population of large chubs now present in the Panguitch Lake, achieving a balanced fishery by an infusion of salmonid predators, if at all possible, would take many years to achieve. In addition, restrictive regulations would be required to protect these predacious trout, which would change the fishery at Panguitch Lake from a traditional family-type fishery to one managed by restrictive regulations requiring catch-and-release for most trout. This alternative would change the nature of the fishery at Panguitch Lake, displace many of the current clientele, and would not fulfill the purpose of the project.

2.2.2 Stocking Cool-Water Predators

Cool-water predators such as walleye (*Stizostedion vitreum*), northern pike (*Esox lucieus*), and/or tiger musky (*Esox masquinongy* x *Esox lucieus*) have been used successfully to control non-game fish populations. However, these predators would also eliminate the trout population. Because cool-water predators are higher on the food chain than trout, under this alternative, Panguitch Lake would support fewer fish and provide less recreational opportunity. This alternative would reduce chub numbers, but would radically change the fishery at Panguitch Lake from a family-type bait fishery to a specialized cool-water fishery, and would not fulfill the purpose of the project.

2.2.3 Smallmouth Bass Introduction

Smallmouth bass (*Micropterus dolomieu*) have reduced Utah chub numbers at other waters and can be compatible with a trout fishery. However, larger trout would need to be stocked to avoid bass predation. In addition, Panguitch Lake water temperatures are

relatively cold and research at Panguitch Lake suggests that smallmouth bass may not recruit annually in this water. In the event that smallmouth bass did recruit, it would take many years to develop a viable bass population and create a balanced fishery. This alternative is experimental and, if successful, would take many years to complete, and would not fulfill the purpose of the project.

2.2.4 Commercial Harvest of Utah Chubs

It was suggested that commercial fishermen be employed to harvest Utah chubs and reduce their numbers at Panguitch Lake. However, a significant portion of the chub population would need to be removed before an advantage to the trout would be clear. In addition, there are no known commercial markets for chubs. The single, large commercial fisherman in Utah was contacted and he completed some trial netting at Panguitch Lake and was unsuccessful in finding a market for chubs. Even if a market were available, to be effective in restoring the fishery, a commercial fisherman would need to fish himself out of business before trout populations would benefit. This alternative is experimental and would require the payment of a commercial harvester, even after chub numbers decrease, to maintain the fishery, and would not fulfill the purpose of the project.

2.2.5 Spot Treatments of Utah Chubs

Spot rotenone treatments have been used to remove Utah chubs from shallow weedy bays during the summer when chubs become abundant in these areas. This was a highly visible program with a public relations benefit. However, actual benefits to the trout population were not realized. Large numbers of chubs need to be removed to elicit a benefit to the trout population. Spot treatment programs were discontinued because they were expensive and measurable improvements did not occur and this alternative does not fulfill the purpose of the project.

2.3 DIRECTION FROM STATE AND FEDERAL PLANNING DOCUMENTS

The proposed action and project activities are documented as compliance required by the National Environmental Policy Act (NEPA) and are consistent with Service rules and regulations. The project is intended to be implemented in 2006 or 2007 and will be funded in-part with a federal grant under the Dingell-Johnson Sport Fish Restoration Act and with matching State license fee funds. The Service administers the D-J Sport Fish Restoration program and must determine the proposed project's eligibility for federal funding, assess its character and design, and ensure compliance with Federal rules and regulations before approving the grant. This Environmental Assessment documents the analysis of the "Proposed Action" as well as the "No Action" alternative under NEPA.

The proposed actions are in agreement with direction provided by the Dixie National Forest Land and Resource Management Plan (DNFLRMP). Specifically goal numbers 13) Coordinate fish and wildlife program with Utah DWR, and 14) Improve the quality of

aquatic habitats through direct habitat management and increased coordination with other land use programs. Specific management activities include B6) Manage waters capable of supporting self-sustaining trout populations for those populations, while management directions include 04A-2) Coordinate lake and stream habitat improvement projects with the state wildlife agencies, where aquatic habitats are below productive potential.

The proposed actions are in agreement with UDWR Aquatic Management Plans (AMP) for the Upper Sevier River drainage (Ottenbacher and Hepworth 1999). Objectives and strategies for specific recreational waters include Objective 11) Maintain or enhance sport-fisheries at Panguitch Lake; by reducing competition with Utah chubs and strategies A) Remove Utah chubs by rotenone treatments when necessary, and B) Utilize more piscivorous species of sportfish (Bear Lake cutthroat trout) to a greater extent when possible.

The proposed actions are also consistent with the vision and goals of the UDWR Strategic Plan (UDWR, 2000). Specifically, the third vision statement reads “the UDWR . . . seeks to maintain healthy populations of game species to meet the recreational demands of traditional wildlife constituents”. Also goals A-1) “Maintain populations of harvestable wildlife species”, C-1) “Increase user recreational satisfaction”, C-3) “Maintain or increase participation”, and D-1) “Increase . . . wildlife-related economies in Utah” all support the proposed project.

2.4 PUBLIC INVOLVEMENT

The scoping process began in April 2005 with newspaper articles announcing a meeting to review the status of Panguitch Lake and begin the creation of the Panguitch Lake Advisory Committee. This committee is composed of 9 members nominated and recommended to UDWR from various agencies and groups who are interested in the management and future of Panguitch Lake. A total of 8 public meetings were held, beginning in May 2005, at which comments were taken and management alternatives were discussed, selected, and formed into a management plan. An application describing the proposed action was sent to the State Resource Development Coordinating Committee, which includes review by the Five County Association of Governments. This association includes representatives of the counties included in the project area as well as counties in the surrounding areas. In addition, a presentation was made to the Garfield County Commission in November 2005.

A legal notice describing the project was published in the Spectrum (St. George) on September 22, 2005 and in the Richfield Reaper on September 28, 2005. These notices invited suggestions for issues to be addressed in the project analysis. Public comments were requested by October 9, 2005. In addition, a scoping letter was sent to over 140 individuals whose names were provided by the Dixie National Forest. Documentation of the publications and a record of responses are in the Project File located at the Southern Region Office, UDWR.

2.5 ISSUES

Seven letters of response were received during or shortly following the scoping period. Based upon input received during the scoping process, and input received during similar projects in the past, six issues were raised as follows:

1. Use of rotenone and activity associated with the projects could adversely impact non-target wildlife and plants including fish, amphibians, insects and birds.
2. Use of rotenone will contaminate drinking water supplies.
3. Use of rotenone and project activities could harm livestock or result in a change in land management that could result in a reduction of livestock use.
4. The project may result in the loss of native fish in the area.
5. The project may result in the loss of threatened, endangered, or sensitive species.
6. Greater emphasis should be given to the use of native trout species over introduced species.

SECTION 3: AFFECTED ENVIRONMENT

This section describes the current status of only those resources within the project area which may be affected by the proposed management activities. Those resources which warrant a cumulative effects analysis include a section which describes the cumulative effects area and past, present, and future management activities which will be included in the analysis.

3.1 FLOODPLAINS/WETLANDS

The proposed treatment would take place within the floodplain and wetland of the project area listed in Section 2.1.1. Wetlands are generally confined to a small area adjacent to the Panguitch Lake, its inlet streams, Panguitch Creek, and several small ponds. There are also a number of springs and seeps associated with the project.

3.2 WATER QUALITY

The Utah Department of Environmental Quality (DEQ) beneficial use designations (1997 revised) for Panguitch Lake include:

> **Class 2B** - Protected for secondary contact recreation such as boating, wading, or similar uses.
> **Class 3A** = Protected for cold water species of game fish and other cold water aquatic life.
> **Class 4** = Protected for agricultural use including crop irrigation and stock watering.

3.3 RECREATION

Panguitch Lake has been a popular recreation destination and has received some of the highest fishing pressure of any comparable water in the state of Utah. Other activities which occur at or near the lake include boating, hunting, hiking, mountain biking, ATV and horseback riding, camping, sight-seeing and wildlife viewing.

3.4 FISHERIES

Fish species present in Panguitch Lake and its tributaries include rainbow trout (*Oncorhynchus mykiss*) , tiger trout, cutthroat trout (*Oncorhynchus clarkii* spp.), brook trout *(Salvelinus fontinalis)*, brown trout and Utah chub. Utah chub are the most abundant fish in Panguitch Lake, while rainbow and cutthroat trout are common, and tiger trout, brown trout, and brook trout are rare. Rainbow trout, cutthroat trout, brown trout, and tiger trout have been stocked regularly, while brook trout were stocked in the past and now persist through natural reproduction. Speckled dace are found in the lower reaches of Panguitch Creek just upstream from the irrigation diversion near the

town of Panguitch.

3.5 WILDLIFE

Numerous species of wildlife utilize the waters and riparian areas in the Panguitch Lake project area. Aquatic species, besides fish, which are susceptible to rotenone and directly impacted by the proposed treatment include aquatic invertebrates and juvenile amphibians. The following is a list of amphibians which may occur in the project area: Tiger salamander, northern leopard frog, and Boreal chorus frog. The American dipper, willow flycatchers, and a variety of species of neotropical birds and bats which utilize aquatic invertebrates for food may also be present in the project area. Many of these species are present only seasonally in southern Utah. Additional species of wildlife are discussed in Sections 3.6, 3.7 and 3.8.

3.6 THREATENED, ENDANGERED, AND PROPOSED SPECIES

The bald eagle (*Haliaeetus leucocephalus*) listed as threatened, is a migrant through the area and occurs in southwestern Utah from November through March. Panguitch Lake is a critical winter roost site for the bald eagle. In addition, the California condor (*Gymnogyps californianus*) may also occur within the project area.

3.7 STATE SENSITIVE SPECIES, U.S. FOREST SERVICE SENSITIVE SPECIES

The UDWR and USFS have compiled Sensitive Species Lists to identify those species in the state that are most vulnerable to population and/ or habitat loss. These lists are intended to stimulate management actions, e.g., development and implementation of a conservation strategy, for listed species. By developing and implementing timely and sufficient conservation measures for Sensitive Species, federal listing of these species under the Endangered Species Act may be precluded. State Sensitive Species which occur or may occur in the project area are listed in Appendix A. That Appendix also lists species which may occur or have suitable habitat in the area which have been designated as Sensitive Species by the Regional Forester. Some of these species may use riparian habitats in the project area or forage on invertebrates associated with the project waters.

3.8 MANAGEMENT INDICATOR SPECIES

The National Forest Management Act, 1976, required National Forests to select a group of representative fish and wildlife species whose populations could be monitored relatively easily. Response of these species to management activities is used as an indicator of effects on other species occupying similar habitat. The Dixie National Forest established two groups of Management Indicator Species (MIS) in the LRMP, one as ecological indicators and another to represent species of high interest. Mule deer, Rocky Mountain elk, wild turkey, resident trout (brown, brook, cutthroat, and rainbow trout) and macroinvertebrates are the ecological indicators present in the

project area. In Section 4, mule deer, Rocky Mountain elk, and wild turkey are addressed in the wildlife section (Part 4.5), while trout are discussed under Fisheries (Part 4.4) and aquatic macroinvertebrates are discussed under water quality (Part 4.2).

3.9 GRAZING

The project area includes private grazing allotments as well as public grazing allotments administered by the Dixie National Forest. The streams are used as a water source by livestock on the allotments. Riparian vegetation in parts of the project area is also used for forage by livestock.

3.10 HISTORIC PROPERTIES and CULTURAL RESOURCES

Chemical treatment of the waters in the project area will have no impact to any historic properties or cultural resources occurring in the area. Consequently, cultural and historic properties will not be discussed further within the document.

3.11 PUBLIC HEALTH AND SAFETY

The project area waters are used by the public for recreational purposes. They are also used for stock watering and for downstream irrigation.

3.12 LOCAL ECONOMY

Panguitch Lake supports a number of lakeside businesses including marinas, lodges, eating establishments, and a small store. In addition, recreation at the lake generates significant revenues for local real estate agencies and other businesses in the area as well as the neighboring towns of Panguitch and Brian Head.

SECTION 4: ENVIRONMENTAL CONSEQUENCES

This section describes the direct and indirect effects of each alternative by resource. Cumulative effects of actions on the resources are discussed in a Section 4.11. For each resource, the effects of the "No Action" alternative are discussed first, followed by the effects of the Proposed Action (rotenone treatment).

4.1 FLOODPLAINS/WETLANDS

4.1.1 No Action - Direct and Indirect Effects

The No Action Alternative would have no direct or indirect effects on wetlands or floodplains.

4.1.2 Proposed Action - Direct and Indirect Effects

There would be no filling or obstruction of floodplains or wetlands during the proposed treatments. Rotenone does not effect aquatic or riparian vegetation. Active beaver dams on inlet streams may be removed to allow the free flow of chemically treated water in the project area. However, experience has show that these dams will be rebuilt within a few days of their removal.

4.2 WATER QUALITY

4.2.1 No Action - Direct and Indirect Effects

There would be no direct or indirect effects to water quality under the No Action Alternative. Rotenone would not be used to treat the project area waters. None of the Beneficial Uses designated for waters in the project area would be affected.

4.2.2 Proposed Action - Direct and Indirect Effects

There would be short-term direct effects to water quality as a result of chemical treatment with rotenone. The primary direct effect would be the toxicity of rotenone to aquatic organisms including fish and some invertebrates. This effect would occur for 3 to 4 weeks following the application of rotenone Panguitch Lake and Panguitch Creek, while the effect would be less than one week in the inlet streams (Bradbury 1986).

Numbers of aquatic invertebrates important to the aquatic ecosystem would be temporarily suppressed. Areas upstream from the target waters or refugia left in the fishless portions of target waters would help insure the re-colonization of the treated portions of the streams and lake. Many invertebrates will survive rotenone at the proposed concentrations, and will expand following treatment. The natural, downstream drift of aquatic insects generally results in the rapid re-colonization of streams following

their removal by natural or man-made events (Hynes 1972). Most or all of the invertebrate species would repopulate the treated area within one or two years (California Dept Fish and Game 1994). In the Strawberry River drainage, where the target concentration of rotenone was greater than that planned for this project, and where an attempt was made to treat all water in the drainage, about 75% of the number of species present before the treatment had recovered after 3 years (Mangum 1999).

Rotenone is non-toxic to mammals, including humans. At the concentrations used to kill fish, it has been estimated that a 132-lb person would have to consume over 60,000 liters of treated water at one sitting to receive a lethal dose. Using a safety factor of 1,000X and the most conservative safe intake level, a person could still drink 14 liters of treated water per day. In addition, extensive testing has not shown rotenone to be carcinogenic (Bradbury 1986). Even though rotenone has been shown to be safe to humans, as a matter of policy, the EPA does not set tolerances for pesticides in potable water. At the same time, the EPA has exempted rotenone from tolerance requirements when applied intentionally to raw agricultural commodities. The State of California (1994) and the National Academy of Science (1983) have computed "safe" levels of rotenone in drinking water which are roughly equivalent to the detection level of rotenone in water (0.005 ppm pure rotenone). Municipal drinking water supplies have been treated with rotenone in at least seven states including Utah. In some cases, rotenone treatment has been used to protect or improve drinking water quality (Hoffman and Payette 1956; Barry 1967). Water in Panguitch Lake will not be used for drinking.

The mobility of rotenone in soil is low. In fact, the leaching distance of rotenone is only 2 cm in most types of soils. This is because rotenone is strongly bound to organic matter making it unlikely that it would enter ground water. At the same time, rotenone breaks down quickly into temporary residues that would not persist as pollutants of ground water. Ultimately rotenone breaks down into carbon dioxide and water.

A secondary indirect effect of the treatment would be a temporary increase in the nutrient input to the water as a result of decomposition of fish that are killed. This effect would occur for a period of several weeks while decomposition occurred. Dead fish will not be available for salvage, but will be allowed to decompose. Natural decomposition will add nutrients to the fishery that can be converted to phytoplankton or algae and become a food resource for aquatic invertebrates. These invertebrates are then available as forage and can be converted into trout biomass. Currently, many of the nutrients are tied up in the biomass of Utah chubs. Following a treatment, this productivity can be converted to trout biomass and will then be available for removal by anglers.

Rotenone is approved by the EPA for the use intended in this project and would be applied according to label instructions by personnel certified as Non-Commercial Pesticide Applicators. Changes in water quality during the project would not impair other uses. Water treated with rotenone will not affect plants and would still be useable by livestock, other mammals, and birds.

4.3 RECREATION

4.3.1 No Action - Direct and Indirect Effects

There would be no direct or indirect effects to recreation under the No Action Alternative.

4.3.2 Proposed Action - Direct and Indirect Effects

Since the primary recreational activity at Panguitch Lake is fishing or fishing related recreation, there would be a direct impact to recreation under the Proposed Action Alternative. Fishing opportunities and success would be reduced during the rotenone treatment and for approximately one month following treatment.

Additional effects of the proposed action would be to increase recreation at Panguitch Lake, over time, by providing increased opportunity to fish for more and larger trout. Fishing related recreation activities would increase as well. Panguitch Lake has been treated on at least three other occasions. Following each treatment, the quality of angling dramatically increased. In addition, data from Strawberry Reservoir revealed a rapid return of anglers to the fishery following a treatment to remove non-game fish. Following the 1974 treatment of Panguitch Lake, angler catch rates were greater than 1.5 fish per hour, compared with the current catch rates of about 0.4 trout per hour.

4.4 FISHERIES

4.4.1 No Action - Direct and Indirect Effects

No direct effects would occur under the No Action Alternative. However, the indirect effects include the continued dominance of Utah chub at Panguitch Lake. No increase in trout or trout habitat would occur and, under the No Action Alternative, no progress would be made toward meeting the objective of the project.

4.4.2 Proposed Action - Direct and Indirect Effects

Under this alternative, direct and indirect effects include the removal of all fish in the project area by application of rotenone. The removal of Utah chub would enhance the quality of angling at Panguitch Lake. Utah chub would be replaced by a healthy fishery comprised of rainbow trout, Bear Lake Bonneville cutthroat trout, and tiger trout.

There would also be an increase in the quality of the trout at Panguitch Lake. Currently, condition, a measure of the fatness of the fish, is low for most trout. The removal of Utah chubs will create food resources that can then be better utilized by trout and will result in improved fish health and condition. The Proposed Action will meet the project objective for fisheries resources.

4.5 WILDLIFE

4.5.1 No Action - Direct and Indirect Effects

There would be no direct or indirect impacts to wildlife under the No Action Alternative. Wildlife populations would continue to function as they currently do.

4.5.2 Proposed Action - Direct and Indirect Effects

There will be no direct or indirect effects to terrestrial MIS species. Neither rotenone nor the treatment activities would adversely affect mule deer rocky mountain elk, or wild turkey. Most wildlife species, including birds, mammals, reptiles, adult amphibians, and some invertebrates are not susceptible to rotenone at the concentrations that would be used in the treatments (Appendix A). Impacts to wildlife associated with the Proposed Action would primarily be limited to some aquatic invertebrates (mainly insects in the project area). Aquatic invertebrates vary in their sensitivity to rotenone, but many species would be reduced or temporarily eliminated within parts of the project areas during the treatment period. Refugia in the project area would facilitate a rapid recovery of invertebrates. These refugia would include stream sections upstream from the target areas and ponds, seep areas, and springs outside the immediate target areas but within the same drainages. Currently, chub numbers keep invertebrate populations suppressed and limited to smaller invertebrate species. The proposed project will improve conditions for invertebrates, create greater diversity among larger invertebrates, and enhance forage conditions for trout. Following the treatments, most aquatic insects in target streams would recover within a year. Other stream invertebrates with longer life cycles may need more time to recover. Insect and zooplankton populations within Panguitch Lake, that are important as trout forage, will recover in a relatively short period of time.

Larval amphibians which might be present in the target area may be killed by the rotenone (Fontenot et al. 1994). However, adult stages of amphibians would be far less vulnerable to rotenone treatment. In addition, seeps, bogs, and untreated waters in the same drainage as Panguitch Lake would provide refugia and sources for re-colonization. These factors insure that amphibian populations would not suffer any long-term impacts due to the proposed action.

Indirect impacts to wildlife may include temporary displacement of some birds feeding on fish and/or aquatic invertebrates. It is also possible that the treatment may decrease the forage base for bats utilizing adult aquatic insects as a portion of their diet. These effects would be short term and are considered minor due to the abundance of terrestrial insects and other alternate prey, the mobility of birds and bats, and the proximity of similar aquatic habitats and prey sources to the project area. The overall effect of the proposed treatment on the wildlife depending on fish or aquatic invertebrates for food, and indirectly, on the processes important to the functioning of

the ecosystem, may be best evaluated by looking at the results of past fish eradication projects. Many waters have been treated with rotenone in the state as well as other parts of the U. S. since the 1950's. These systems have all recovered quickly with no apparent long-term impacts on associated ecosystems. In many instances, trout, whose diet consists primarily of aquatic invertebrates have been successfully stocked in a water within a month or two following treatment.

4.6 THREATENED, ENDANGERED SPECIES

4.6.1 No Action - Direct and Indirect Effects

The southwest willow flycatcher *Empidonax traillii extimus,* may occur in the project area (USFWS, 2002); the Bald eagle occurs in the project area as a winter migrant and Panguitch Lake may become essential wintering habitat (USFS, 2004); Arizona willow is listed as an endangered species and does occur in the project area; and the California Condor may also occasionally visit the project area as a migrant. There would be no effect on any of these species under the No Action Alternative.

4.6.2 Proposed Action - Direct and Indirect Effects

The southwestern willow flycatcher is an endangered species. However, the project area is north of the subspecies' normal distribution and is outside designated critical habitat in the Virgin River drainage. If southwestern willow flycatchers do exist in the area, the impacts of the Proposed Action would be short-term and indirect. Rotenone is not toxic to birds at the concentrations that would be used. The southwestern willow flycatcher is a neotropical migrant and would probably be in the area between mid-May and mid-August (Tibbitts et al. 1994). The project may occur during this time, however the temporary nature of the impacts, and the availability of alternate (terrestrial) prey items would minimize indirect impacts on any insectivorous birds in the area.

Rotenone will not effect vegetation, so any Arizona willow which might be in the area would not be directly affected. Riparian vegetation would not be disturbed during the course of the project.

The Bald eagle is federally listed as a threatened species. It occurs in the project area as a winter migrant and Panguitch Lake is a critical winter roosting site. The California condor also occasions the project area (Noyes, 2001). In addition, one pair of bald eagles were seen in the project area during the spring and may have attempted to nest. While Bald eagles feed on fish, both condors and eagles feed on carrion and rabbits. During past rotenone treatment projects at Otter Creek Reservoir, bald eagles were observed feeding on fish killed during the treatment and treated fish will not be toxic to carrion birds at the concentrations used to kill them in this project (Brazier, 2005; Appendix D). Consequently, these fish probably represent a supplemental food source to these birds during the project period. Following treatment, however, this resource will be missing for approximately 4 weeks. During that time any eagles nesting in the area

would be forced to forage at alternate nearby sites for fish (Navajo Lake, Yankee Meadow, Red Creek Reservoir and others).

4.7 SENSITIVE SPECIES

4.7.1 No Action - Direct and Indirect Effects

The No Action Alternative would not have direct of indirect effects on any of the birds, mammals, or amphibians listed in Appendix A.

4.7.2 Proposed Action - Direct and Indirect Effects

The Proposed Action would not have any direct impacts on any of the birds, mammals, or adult stages of the amphibians listed in Appendix A. These species/stages are not susceptible to rotenone at the concentrations used in the proposed treatment.

Possible indirect effects to some of the piscivorous and insectivorous species listed in Appendix A (some birds, bats) include the temporary loss of a portion of their available forage base of adult flying insects. Specifically, the American White Pelican (*Pelecanus erythrorhynchos*) is a seasonal migrant and summer resident at Panguitch Lake. These birds would be displaced to other nearby waters until fish populations were re-established. Impacts to other species would be short-term and would be minimized by the presence of alternate prey species and alternate forage sites.

4.8 GRAZING

4.8.1 No Action - Direct and Indirect Effects

Under the No Action Alternative, there would be no direct or indirect effects on livestock or grazing.

4.8.2 Proposed Action - Direct and Indirect Effects

There would no direct or indirect effects to livestock or grazing under the Proposed Action. Rotenone is not toxic to livestock and the EPA has stated that there is no need to restrict livestock consumption of treated waters. Rotenone has been used in the past as an insecticide on plants and to control grubs on cattle. When the current allotment management plans are revised for the Project Area, grazing practices will be reviewed to determine if they are meeting Management Area goals. Those effects are beyond the scope of this analysis for the Proposed Action.

4.9 PUBLIC HEALTH AND SAFETY

4.9.1 No Action - Direct and Indirect Effects

There are no direct or indirect effects to public health and safety under the No Action Alternative.

4.9.2 Proposed Action - Direct and Indirect Effects

Panguitch Lake is not a source for drinking water. Rotenone has a very low toxicity to humans (Appendix C). It can be irritating to eyes, nose, mouth, and throat if exposure occurs. UDWR personnel are licensed by the State Department of Agriculture to apply aquatic pesticides. Rotenone would be applied according to label specifications and appropriate safety gear and procedures would be used.

4.10 LOCAL ECONOMY

4.10.1 No Action - Direct and Indirect Effects

Direct effects, to the local economy, under the No Action Alternative are ongoing. Currently, fishing recreation is slow and the local economy is depressed. Under this alternative no improvement to the fishery would be realized and a continued decline of the fishery is likely to lead to further declines in revenue for local businesses.

4.10.1 Proposed Action - Direct and Indirect Effects

Under the Proposed Alternative there would be a direct impact to the local economy during the month that Panguitch Lake was without a fishery. Recreation at the lake and revenue to local businesses would decline during this month. To offset the decline media outlets in Utah and Nevada would be contacted to advertise the reopening of the lake and to promote the fishery. The removal of Utah chubs will dramatically improve fishing at Panguitch Lake resulting in a long-term increase in recreation and revenue to the local economy.

4.11 CUMULATIVE EFFECTS

4.11.1 No Action - Cumulative Effects

Under the No Action Alternative there would be no cumulative effects to any of the resources addressed except recreation, the fishery, and the local economy. If no action is taken, the cumulative effects to these resources will include the continued dominance of Utah chubs at Panguitch Lake, the lingering depression of fishing recreation, and the continued depressed status and decline in revenues for local businesses that rely on the fishery. The inability of management agencies to address the current problems of the fishery would be an incentive for anglers to fish elsewhere and would add to the

declines in recreation and revenue.

4.11.1 Proposed Action - Cumulative Effects

There will be no cumulative effects of the proposed action on floodplains, wetlands, water quality, livestock grazing, or public health and safety as a result of this alternative. Treated waters are not used for public consumption and are not toxic at the concentrations proposed in the rotenone treatment. However, there will be cumulative effects of this project to some wildlife species including threatened, endangered, and sensitive species. These effects include the temporary disruption of wildlife habitats by project workers, the temporary loss of some aquatic insects that provide forage for some birds and bats, the disturbance of possible nesting sites for birds, and the temporary removal of beaver dams that obstruct stream flows. These impacts would be short-term and are minimized by the presence of other food organisms, alternate nesting sites, and refugia habitat outside the treatment area.

There will also be cumulative effects of the proposed work to the fishery, angling recreation, and the local economy. There will be an increase in the quality of angling opportunities at Panguitch Lake. There will also be a sustained increase in angling recreation and in revenues for local businesses associated with Panguitch Lake. In fact, Panguitch Lake has been treated on at least three other occasions. Following each treatment, the quality of angling dramatically increased. Following the 1974 treatment of Panguitch Lake, angler catch rates were greater than 1.5 fish per hour, compared with the current catch rates of about 0.4 trout per hour.

4.12 COMPLIANCE WITH OTHER LAWS

4.12.1 Clean Water Act

The Clean Water Act (CWA) requires each state to implement its own water quality standards. The State of Utah's Water Quality anti-degradation Policy requires maintenance of water quality to protect existing instream Beneficial Uses on lakes and streams designated as Category 1 High Quality Waters. All surface waters geographically located within the outer boundaries of the National Forest, whether on private or public lands are designated as High Quality Waters (Category 1). This means they will be maintained at existing high quality. New point sources will not be allowed and non-point sources will be controlled to the extent feasible through implementation of Best Management Practices (BMPs) or regulatory programs (Utah Division of Water Quality 1994). The State of Utah and the Forest Service have agreed through a 1993 Memorandum of Understanding to use Forest Plan Standards & Guidelines and the Forest Service Handbook (FSH) 2509.22 Soil and Water Conservation Practices (SWCPs) as the BMPs. The use of SWCPs as the BMPs meet the water quality protection elements of the Utah Nonpoint Source Management Plan.

The Beneficial Uses and High Quality of water in the lakes and streams in the Project

Area would be maintained during and following project implementation through the proper implementation of BMPs (SWCPs) as described in Chapter Two.

4.12.2 Executive Order 11990, Protection of Wetlands of May, 1997

This order requires all Federal Agencies to take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In compliance with this order, the Service requires that an analysis be completed to determine whether adverse impacts would result.

The location of wetlands in the Project Area were identified in the delineation and inventory of critical watershed areas. No ground disturbing activities will occur within 50 ft of any wetland, seep, or spring. With a 50 ft buffer area around any wetlands, seeps, or springs and implementation of SWCPs, any of the alternatives would be in compliance with Executive Order 11990.

4.12.3 Executive Order 11988, Floodplain Management of May, 1977

This order requires all Federal Agencies to provide leadership and to take action to (1) minimize adverse impacts associated with occupancy and modifications of floodplains, and reduce risks of flood loss, (2) minimize impacts of floods on human safety, health, and welfare, and (3) restore and preserve the natural and beneficial values served by floodplains. In compliance with this order, the Service requires an analysis be completed to determine the significance of impacts of Proposed Actions to floodplains.

No ground disturbing activities will be allowed within 50 ft of any stream channel (ephemeral, intermittent, and/or perennial), except at road crossings. Impacts related to road crossings will be minimized or prevented through implementation of SWCPs. Therefore any of the proposed alternatives will be in compliance with Executive Order 11988.

4.12.4 Endangered Species Act of 1973, as Amended

Based on discussions in Chapters Three and Four concerning threatened and endangered plant and wildlife species and detailed discussions contained in the Biological Assessment (Brazier, 2005, Appendix IV), it has been determined that there would be no effects to populations of threatened, endangered, or candidate wildlife or plant species relative to the Proposed Action or any alternative.

4.12.5 American Antiquities Act of 1906 and Historic Preservation Act of 1966

Based on the discussions in Chapters three and Four concerning cultural and historic resources, and project file documentation, it has been determined that there will be no effects to any cultural or historic Properties relative to any of the alternatives.

4.12.6 Clean Air Act, as Amended 1977

Based on discussions in Chapter Three and Four concerning air quality, it has been determined that there would be no measurable effects to air quality in class I or II airsheds relative to any of the alternatives.

4.12.7 Executive Order 13186, Invasive Species of January 2001

This order requires Federal Agencies to evaluate environmental actions and projects for their effects on migratory birds. There will be no direct impact on migratory species as a result of treatment activities. Indirect effects include the temporary displacement of piscivorous migratory fowl, the reduction of aquatic insects that provide food for some migratory birds, and the temporary invasion of riparian habitats by project workers.

These impacts will be minimized by the short-term nature of the project and by the close proximity of alternative forage sites and species. Non-piscivorous migratory waterfowl will be impacted for the duration of the treatment (2-4 days), while migratory birds that rely on forage from the lake may be displaced for up to one month.

4.13 MONITORING

Implementation and effectiveness monitoring will be conducted to measure the effects of the selected alternative on aquatic resources within the project area.

Implementation monitoring assesses whether or not the project was implemented as described in the EA. Effectiveness monitoring determines if the management actions accomplished what was intended and whether the objective was achieved and is discussed below.

4.13.1 Monitoring Objective

The objective for implementation monitoring is to develop and follow treatment plans that will effectively and efficiently remove Utah chubs from Panguitch Lake and its associated waters. The objective for effectiveness monitoring is to determine if Utah chubs have been removed from treated waters, that the effects have not extended beyond the treatment area, that alternate trout species have been established, and that increased angling opportunities for quality trout have resulted.

4.13.2 Monitoring Plan

Waters will be thoroughly examined following treatment to ascertain whether a complete removal of Utah chubs has occurred, and to determine the extent of fish loss in downstream areas. All monitoring will be conducted by UDWR employees.

To verify chub removal in Panguitch Lake, experimental gill nets will be set at 6 random

locations one week following treatment. The absence of fish will indicate success. To determine treatment effectiveness on inlet streams, three survey stations of 350 m each will be established in Blue Springs Creek, Clear Creek, and Ipson Creek. Again, the absence of fish in treated streams will indicate success. Sentinel fish placed in live cages downstream from Panguitch Lake will be used to determine treatment extent. A total of four sites will be monitored. The first cage will be stationed at the road crossing of Panguitch Creek just below Panguitch Lake dam. The second cage will be set immediately above the upper detox station below the confluence of Panguitch Creek and Butler Creek. Sentinel fish in cage number three will be stationed one half mile below the upper detox station just above the lower detox station, while the final sentinel cage will be placed one half mile below the lower detox station. The loss of fish in the uppermost cage will indicate that toxic water is being released from the lake. Stressed fish in cage two will activate the upper detox station, while cage three will activate the lower detox station. Cage four will be used to ensure complete detox. Live cages will be checked at least hourly during treatment and detox operations.

To evaluate overall success and project longevity, experimental gill nets will be set at four standard net locations in Panguitch Lake each spring beginning in 2007. Similar trend netting data is available for 30 previous years and trends in trout populations will continue to be monitored using data from these experimental gill nets. Increased numbers of trout in the nets will determine success, while the capture of Utah chubs will activate the stocking of additional predators to help control Utah chub populations that may return to the lake. Initial estimates of project success will cost approximately $2,000, while monitoring the successful development of the sport fishery will be ongoing. Success will be documented in a report from UDWR Aquatics Biologists to be filed in the regional office. In addition, an angling creel survey, following standard survey protocol, is planned for 2008 to estimate angler catch rates, fishing pressure, and the total annual harvest of trout at Panguitch Lake. These parameters can then be compared to previous creel surveys.

SECTION 5: LIST OF PREPARERS

The following individuals assisted in the preparation of this document or provided technical support.

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SECTION 6: LIST OF AGENCIES AND PERSONS CONSULTED DURING SCOPING

Dixie National Forest

Five County Association of Governments

Garfield County Commission (November 14, 2005 - Commission Meeting)

Panguitch Lake Advisory Committee (8 public meetings)

Public Scoping Letters to nearly 140 individuals and groups (7 responses)

Richfield Reaper (2 legal notices advertising meetings and scoping)

Spectrum Paper in St. George (2 legal notices advertising meetings and scoping)

Utah State Division of Water Rights

Utah State Regional Advisory Council (RAC - Citizen oversight committee to UDWR)
Utah State Resource Development Coordinating Committee (State of Utah project clearance process)

Utah State Division of Wildlife Resources

Utah Wildlife Board (Citizen oversight committee to UDWR)

U.S. Fish and Wildlife Service, Mountain and Prairie Region 6.

SECTION 7: LITERATURE CITED

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Appendix A

Federally listed Threatened, Endangered, Candidate and UDWR Sensitive Species, which occur or may occur in the project area.

Appendix A. Federally listed threatened, endangered, candidate and UDWR Sensitive Species, which occur or may occur in the project area.

COMMON NAME / *SCIENTIFIC NAME*	USFWS[1]	USFS[2]	UDWR[3]
MAMMAL SPECIES			
Allen's big-eared bat *Idionycteris phyllotis*			SD
Big free-tailed bat *Nyctinomops macrotis*			SP/SD
Brazilian free-tailed bat *Tadarida brasiliensis mexicana*			SP/SD
Fringed myotis *Myotis thysanodes*			SD
Marten *Martes americana*			SD
Pika *Ochotona princeps*			SD
Spotted bat *Euderma maculatum*		S	SP
Townsend's big-eared bat *Plecotus townsendii*		S	SP/SD
Western red bat *Lasiurus blossevillii*			SP/SD
Western small-footed myotis *Myotis ciliolabrum*			SD
BIRD SPECIES			
American white pelican *Pelecanus erythrorhynchos*			SD
Bald eagle *Haliaeetus leucocephalus*	T		T
California Condor *Gymnogyps californianus*	E/NE		SD
Common yellowthroat *Geothelypis trichas*			SP
Ferruginous hawk *Buteo regalis*			T

Grasshopper sparrow *Ammodramus savannarum*			SP/SD
Mexican spotted owl *Strix occidentalis lucida*	T		T
Northern goshawk *Accipiter gentilis articapillus*		S	SP
Osprey *Pandion halietus*			SD
Southwestern willow flycatcher *Empidonax traillii extimus*	E		E
Swainson's hawk *Buteo swainsoni*			SP
Three-toed woodpecker *Picoides tridactylus dorsalis*		S	SD
Williamson's sapsucker *Sphyrapicus thyroideus*			SD
FISH SPECIES			
Bonneville cutthroat trout *Oncorhyncus clarki utah*		S	CS
Colorado River cutthroat trout *Oncorhyncus clarki pleuriticus*		S	CS
AMPHIBIAN SPECIES			
Boreal toad *Bufo boreas*			SP

1) E = federally listed as endangered; T = federally listed as threatened; NE = federally classified as a nonessential population.
2) E = federally listed as endangered; T = federally listed as threatened; S = Sensitive species as classified by the Regional Forester, Region 4.
3) E = state listed as endangered; T = state listed as threatened; SP = of special concern due to declining populations; SD = of special concern due to limited distribution; CS = managed under a Conservation Agreement to preclude its listing.

Appendix B

Panguitch Lake Management Plan

PANGUITCH LAKE SPORT FISHERY MANAGEMENT PLAN
Panguitch Lake Advisory Committee

B.1 COMMITTEE REPRESENTATION

An advisory committee was formed on May 10, 2005 to provide public input to the Division of Wildlife Resources (DWR) regarding the management of the Panguitch Lake fishery. Members were nominated through input and recommendations from various groups interested in Panguitch Lake. The committee was represented by:

Tracy Armstrong - Blue Springs Lodge - Lakeside Business
Dave Black - Southern Utah Anglers - Local Angler
Dr. Jim Bowns - Wildlife Board for the State of Utah
Steve Brazier - Aquatics Biologist - Dixie National Forest
Allen Henrie - Panguitch City - Public Official
Jack Hill - Southern Regional Advisory Council to the Utah Division of Wildlife
Donnie Hunter - Local Angler
Ed Owens - Owens General Store - Panguitch Business
Brandon Smith - Rustic Lodge - Lakeside Business

B.2 ADVISORY COMMITTEE MISSION

The committee charged itself with the mission to:

Adopt a sport fishery management plan for Panguitch Lake that will provide the Utah Division of Wildlife Resources direction and recommendations to create a quality sustainable fishery at Panguitch Lake.

B.3 OBJECTIVES

To create a quality sustainable fishery four objectives were identified:

1. Maintain an average catch rate of 50 trout per net-night in annual trend nets.
2. Maintain at least 10% of the rainbow trout captured in annual trend nets as 2-year old or older fish (at least 15 inches in length).
3. Increase predator trout (Bear Lake Bonneville cutthroat trout and tiger trout) to 25% of total annual trend netting catch.
4. Produce mean angler catch rates of at least 0.5 trout per hour.

B.4 BACKGROUND AND CURRENT STATUS

Panguitch Lake is situated at an elevation of 8,212 feet approximately 18 miles southwest of Panguitch, Utah. It covers 1,234 surface acres, holds 40,100 acre-feet of water, and has a

maximum depth of 66 feet. The lake is the source of Panguitch Creek and is fed by three small inlet streams; Blue Springs Creek, Clear Creek, and Ipson Creek. Panguitch Lake is one of southern Utah's most popular and productive fisheries. Nearly 70% of all anglers at Panguitch Lake are non-residents.

To monitor the sport fishery annual trend nets are set each spring at Panguitch Lake. For the past 25 years, these surveys produced an average catch of nearly 50 trout per net. This catch rate is one of the highest in the state. However, in 2003 catch rates dropped to 22 trout per net, and by spring 2004 catch rates had fallen to only 4 trout per net. The 2004 catch is the lowest recorded in over thirty years at Panguitch Lake. While trout numbers have declined, numbers of Utah chubs have greatly increased. By 2004, Utah chubs made up 94% percent of all fish captured.

Utah chubs increased to high levels at Panguitch Lake on three previous occasions. In the early 1950's, early 1970's, and late 1980's chub populations expanded until they impaired the trout fishery in the lake. Each time the problem occurred, it was followed by a chemical treatment to restore the sport fishery. These treatments occurred in 1956, 1973, and 1991. During the 1973 treatment, Utah chubs were successfully eradicated from Panguitch Lake and Utah chubs were not seen again for 9 years. However, because of thick weed beds in the lake during the fall of 1991, treatment efforts did not result in complete removal of Utah chubs. Consequently, chub populations have again increased to create the current problem.

In an attempt to reverse trends in the sport fishery, the DWR implemented several management changes at Panguitch Lake. First, the number of predatory fish stocked was increased. Bear Lake Bonneville cutthroat trout were stocked in Panguitch Lake for over ten years. In addition, tiger trout were stocked in 2004 to evaluate their performance as a predator on Utah chubs. Second, the harvest of rainbow trout was limited to 4 fish per angler, while the harvest of Bear Lake Bonneville cutthroat trout was limited to one fish over 22 inches in length. Finally, the number and size of fish stocked into Panguitch Lake was increased. In the early 1980's less than 5 pounds of 3-inch trout were stocked per acre at Panguitch Lake. In the late 1980's and early 1990's 5-inch fish were stocked to avoid competition with chubs and predation from birds. These fish were stocked at 10 to 12 pounds per acre. By 2004, 9-inch fish were being stocked at nearly 35 pounds of trout per acre. That was the highest stocking rate of any comparable water in Utah for 2004. Annual cost to anglers was about $140,000.

Despite efforts to correct problems, the trout fishery has continued to decline and the high cost of stocking can no longer be justified. Because of the lake's importance and the potential for controversy the Panguitch Lake Advisory Committee was formed.

B.5 ALTERNATIVES AND OPTIONS

The committee evaluated a number of management options. Those that follow were not selected as the proposed alternative, but merit discussion to illustrate alternatives that were considered and document why they were rejected.

B.5.1 Stocking of predacious trout in association with restrictive fishing regulations.

Plan: Protect trout such as Bear Lake Bonneville cutthroat trout, brown trout, tiger trout, and splake from harvest so they would grow large enough to prey on chubs. Stock these species of trout in large numbers and build the population to regain balance with chub numbers.

Drawbacks: Traditional fishing would be changed from family-type fishing to restrictive regulations requiring catch-and-release regulations. It may take years to regain a balanced fishery, if ever, and restrictive rules might be needed indefinitely. With the large population of older, large chubs now present in the lake, predaceous trout might fail to control chub populations. Compliance and enforcement of restrictive regulations can be a problem.

B.5.2 Introduce cool-water predators other than trout to replace the trout fishery.

Plan: Introduce fish such as walleye, northern pike, and/or tiger musky. Discontinue stocking of trout when these predators take over the lake. Manage Panguitch Lake as a cool water fishery similar to Pine View Reservoir, Starvation Reservoir, and Willard Bay.

Drawbacks: Trout are near the bottom of the food chain and forage on invertebrates. Cool-water predators are higher on the food chain and require fish as part of their diet. There are great energy losses with each step in the food chain. For example, a pike would eat about 100 pounds of fish to grow 5 pounds. Therefore, a lake can support about 95% more trout than higher level predators such as pike. As a result, a trout fishery will support much more recreation and business than a pike fishery. This is why Utah, with comparatively little water, emphasizes trout fishing over warm and cool-water predators. Trout provide more recreational opportunity per acre of water than most other species of fish.

B.5.3 Introduce yellow perch and/or smallmouth bass to control chubs, and continue with the trout fishery.

Plan: Yellow perch and smallmouth bass could be introduced and be compatible with continued stocking of trout. Perch and bass would prey on chubs, reduce chub numbers, and over time, improve conditions for trout. In addition, these fish would offer alternative fishing opportunities.

Drawbacks: Although smallmouth bass have been shown to be compatible with trout fisheries in Utah, it requires stocking larger trout to avoid bass predation on the smaller trout. Panguitch Lake water temperatures are relatively cold and smallmouth bass may not reproduce consistently. Even if smallmouth bass did reproduce, it could take many years to develop a viable population. Yellow perch stocking would be highly experimental with an uncertain outcome. Yellow perch would likely compete directly with trout and prey upon trout eggs and fry.

B.5.4 Commercially harvest chubs to reduce and control numbers.

Plan: Allow commercial harvest of chubs or pay a commercial fisherman to harvest chubs from Panguitch Lake. Over time, chub numbers could be reduced and trout fishing may improve.

Drawbacks: There are no known commercial markets for chubs. The single, large commercial fisherman in Utah was contacted a few years ago. He completed some experimental netting at Panguitch Lake and was unsuccessful in finding a market for chubs. Even if a market were available, to be effective in restoring balance to the fishery, a commercial fisherman would need to fish himself out of business.

B.5.5 Spot treat chubs with rotenone to reduce and/or control chubs and improve the trout fishery.

Plan: Spot-treat shallow weedy bays during the summer to kill chubs that become abundant in these areas.

Drawbacks: This has been attempted in the past. It was a highly visible program with a public relations benefit. However, actual benefits to the trout population were not realized. Large numbers of chubs would need to be removed to elicit a benefit to the trout population. Spot treatment programs were discontinued because measurable improvements failed to occur. In addition, spot treatments would likely not be environmentally acceptable.

B.5.6 Combinations of the above and/or other new species introductions.

Plan: Use a combination of predaceous trout, smallmouth bass, commercial harvest, and spot treatments. Consider use of other species such as green sunfish, bluegill, and Sacramento perch. Manage Panguitch Lake to reduce chubs and improve conditions for trout.

Drawbacks: Limitations and problems would largely be the same as discussed above. Any such plan would be highly experimental with the results being unpredictable and potential benefits, if any, being delayed for years.

B.7 PREFERRED ALTERNATIVE

After a number of committee meetings and the presentation of background information, current data, additional public input, and rotenone facts, **the committee concluded that the most effective method of restoring a quality trout fishery at Panguitch Lake would be the complete removal of all Utah chubs.**

Plan: Use rotenone to completely remove all fish from Panguitch Lake, portions of its three inlet streams, and the upper reaches of Panguitch Creek. A complete removal of Utah chubs would ensure a good starting point for any management plan that would follow.

Drawbacks: The costs in time and money associated with a treatment of this size will be significant.

B.8 PLAN IMPLEMENTATION

B.8.1. Treatment Implementation

Because fishing at Panguitch Lake has deteriorated and because a prolonged period of poor fishing would negatively impact businesses at the lake, the committee concluded that a complete eradication of Utah chubs should occur as soon as possible. Spring of 2006, shortly after ice-out, was selected as the preferred time to implement the project (late April or early May). Approximately 2 days would be needed to complete the entire treatment of tributary streams, upstream ponds, and Panguitch Lake. Treatment of the lake would also result in the treatment of Panguitch Creek immediately below the lake. The spring of the year was selected as the preferred treatment time so as to avoid thick weed beds that dominate the shallows of the lake during the fall and prevent dispersal of rotenone.

B.8.2. Trout Fishery Restocked

Approximately four weeks would be necessary for rotenone to detoxify. This would allow the restocking of Panguitch Lake in late May or early June. Both catchable (10-inch) and fingerling (3-inch) rainbow trout will be restocked following the treatment to immediately restore the fishery. In addition, some larger brood fish will be stocked to provide trophy-size fish for anglers. Fingerling rainbow trout will grow to catchable size by the fall of their first year in the lake.

B.8.3. Long-term Management

Panguitch Lake is currently managed as a family fishery. To maintain this water as a family destination the advisory committee proposes the stocking of primarily rainbow trout. However, two salmonid predators will be stocked to help control Utah chubs, should they return. These fish are the Bear Lake Bonneville cutthroat trout and tiger trout. Both fish are aggressive predators, grow to relatively large sizes, and are easy to catch. To maintain the fishery, a 4-fish limit will be recommended allowing the harvest of only one predator (cutthroat and/or tiger trout) over 22 inches in length.

B.8.4. Public Relations

To disseminate information, promote business, and facilitate a smooth implementation of the management plan the committee recommends the following actions.

1. Public education should begin early in the process to inform anglers about the management plan and its benefits.
2. Panguitch Lake should be opened to an 8-fish limit prior to treatment to allow the harvest of remaining trout and promote recreation.
3. An opening day should be advertised following the restocking of Panguitch Lake.
4. Multiple media outlets should be contacted in Utah, Nevada, and California. These outlets should include: papers, newsletters, flyers, sportsmen shows, the DWR website, Panguitch City travel council, and private sporting goods outlets.

B.8.5. Habitat Recommendations

Water quality studies at Panguitch Lake show a slow eutrophication of this important fishery. While neither Utah Division of Wildlife Resources or the Panguitch Lake Advisory Committee have management authority regarding land management issues, the committee would like to make recommendations regarding land management actions in the Panguitch Lake watershed:

1. In the 1980's the Blue Springs watershed was identified as source of erosion and runoff into Panguitch Lake. A project was implemented to protect the riparian habitats of that drainage. In recent years, these measures have begun to fail and erosion is again a problem in this drainage. Both public and private land owners should be encouraged to restore this project and protect this drainage.

2. Natural reproduction of rainbow and cutthroat trout would enhance the management plan proposed for Panguitch Lake. However, spawning habitat is limited in the drainage. Currently a number of beaver dams block spawning runs up Blue Springs. The removal of beaver and beaver dams in this stream would add over two miles of stream habitat containing high quality spawning sites.

3. Nutrient inputs into Panguitch Lake are slowly increasing the anoxic zone of the lake. A potential source of these nutrients comes from the septic tanks of cabins along the shore of the lake. A sewage system should be considered in the future for protection of the lake and fishery.

B.9 PANGUITCH LAKE ADVISORY COMMITTEE SIGNATORIES

_____

Tracy Armstrong - Local Business Owner Date

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Dave Black - Southern Utah Angler Date

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Dr. Jim Bowns - Wildlife Board Date

_____

Steve Brazier - Biologist, Dixie National Forest Date

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Allen Henrie - Panguitch City Manager Date

_____

Jack Hill - Southern Region RAC Date

_____

Donnie Hunter - Southern Utah Angler Date

_____

Ed Owens - Panguitch City Business Owner Date

_____

Brandon Smith - Local Business Owner Date

Appendix C

Better Fishing Through Management - How Rotenone is Used to Help Manage Our Fishery Resources More Effectively

Appendix D

Biological Assessment for Panguitch Lake Fisheries Enhancement Project
Dixie National Forest